



Post Katrina Meeting Lessons Learned



Steve Turner, Sr. Mgr., Safety and Emergency Ops
Lockheed Martin Space Systems Company
Michoud Operations



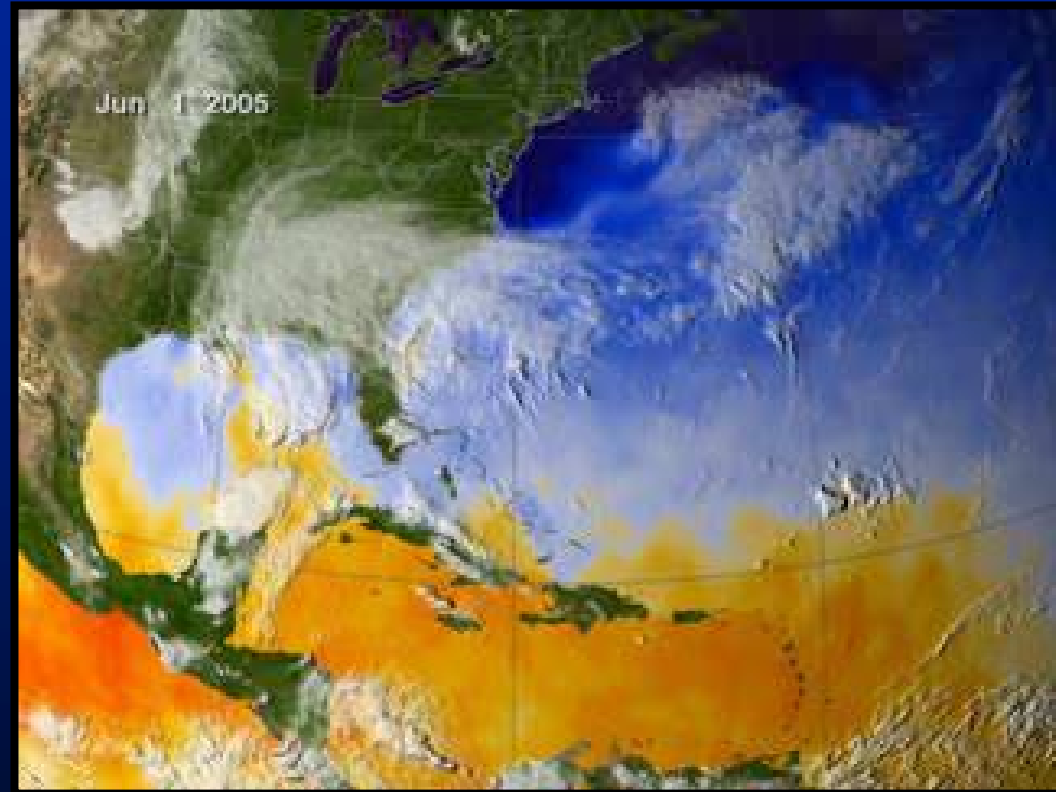
Agenda

- 2005 Hurricane Season overview
- Hurricane Katrina History
- MAF Damage
- Successes
- Lessons Learned
- Summary

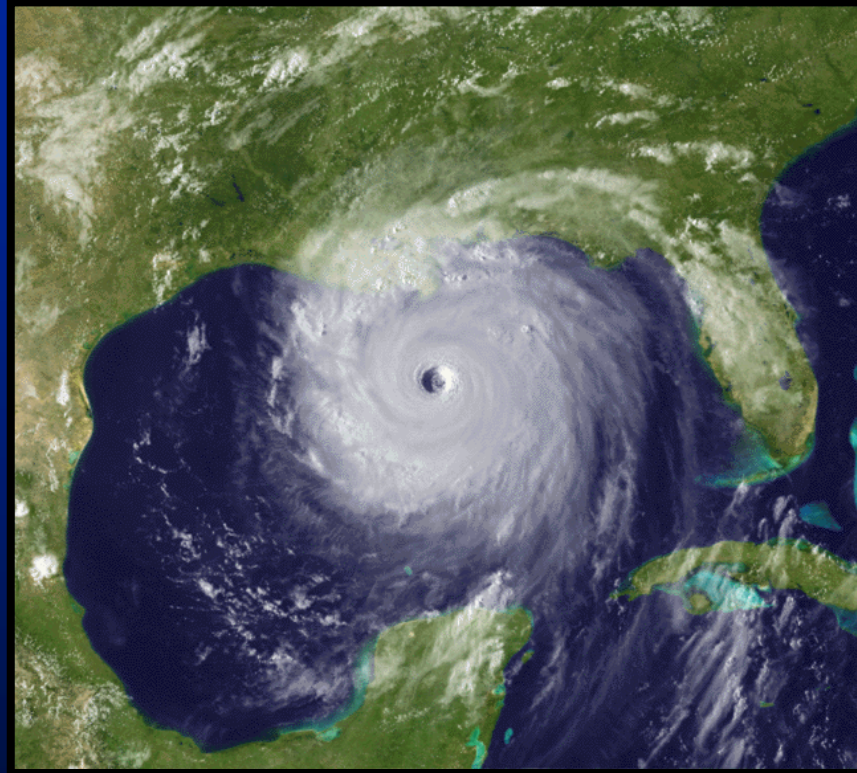
2005 Hurricane Season Summary



- The 2005 Hurricane Season experienced its first named storm on June 8.
- As of Nov., 27 storms had formed in the Atlantic with 24 reaching Tropical Storm strength.
 - 13 developed into hurricanes. 9 entered the Gulf.
- Many had impacted LMC Facilities
- Hurricane Katrina developed on August 23rd, struck Michoud, LA and Stennis, MS on August 29th



Hurricane Katrina History





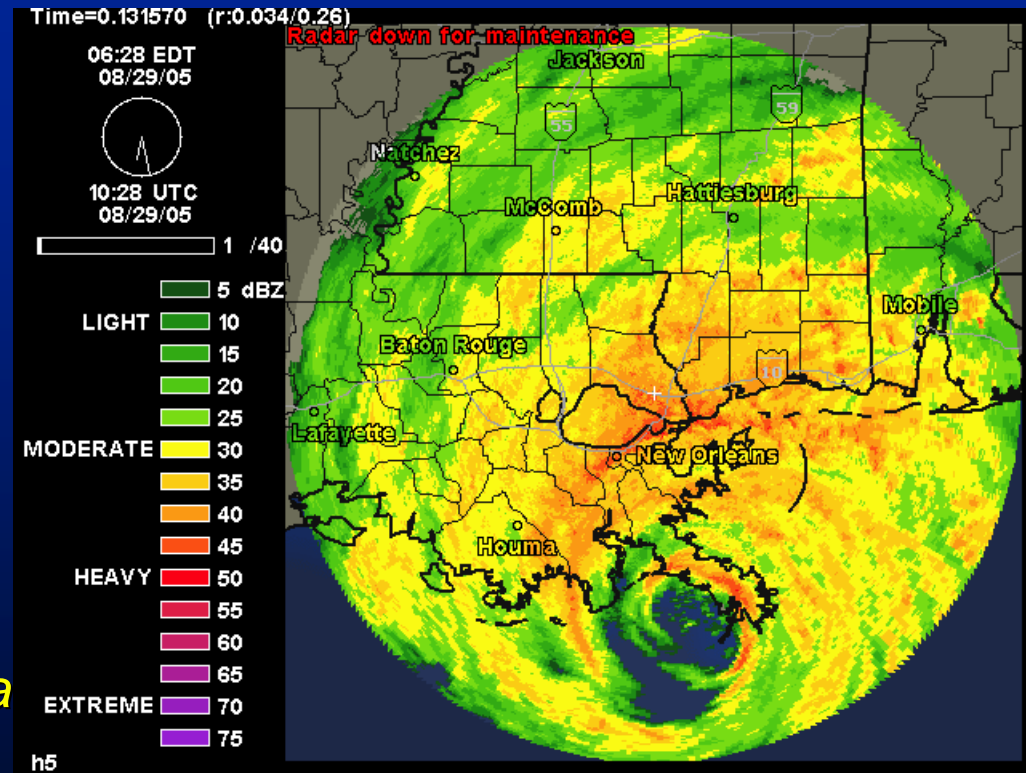
Hurricane Katrina History

- *August 24, 10 am - Tropical Depression Twelve was named Tropical Storm Katrina*
 - *Safety Department began tracking Katrina*
 - *Storm track prediction made numerous changes from the Florida panhandle to New Orleans.*
- *August 26, 2 am - Katrina entered the Gulf of Mexico*
- *August 26, 11 pm - projected path changed to impact New Orleans*
- *August 28th, 8 am - Hurricane Katrina was a Category 5 storm with wind speeds of 165 mph tracking north.*
- *August 29, 2 am - Katrina is downgraded to a Category 4 with wind speeds of 155 mph*
- *August 29, 4 am - MAF began to experience hurricane force winds, which continued through 2:00 that afternoon dumping 14" of rain, with winds estimated at 150 mph.*

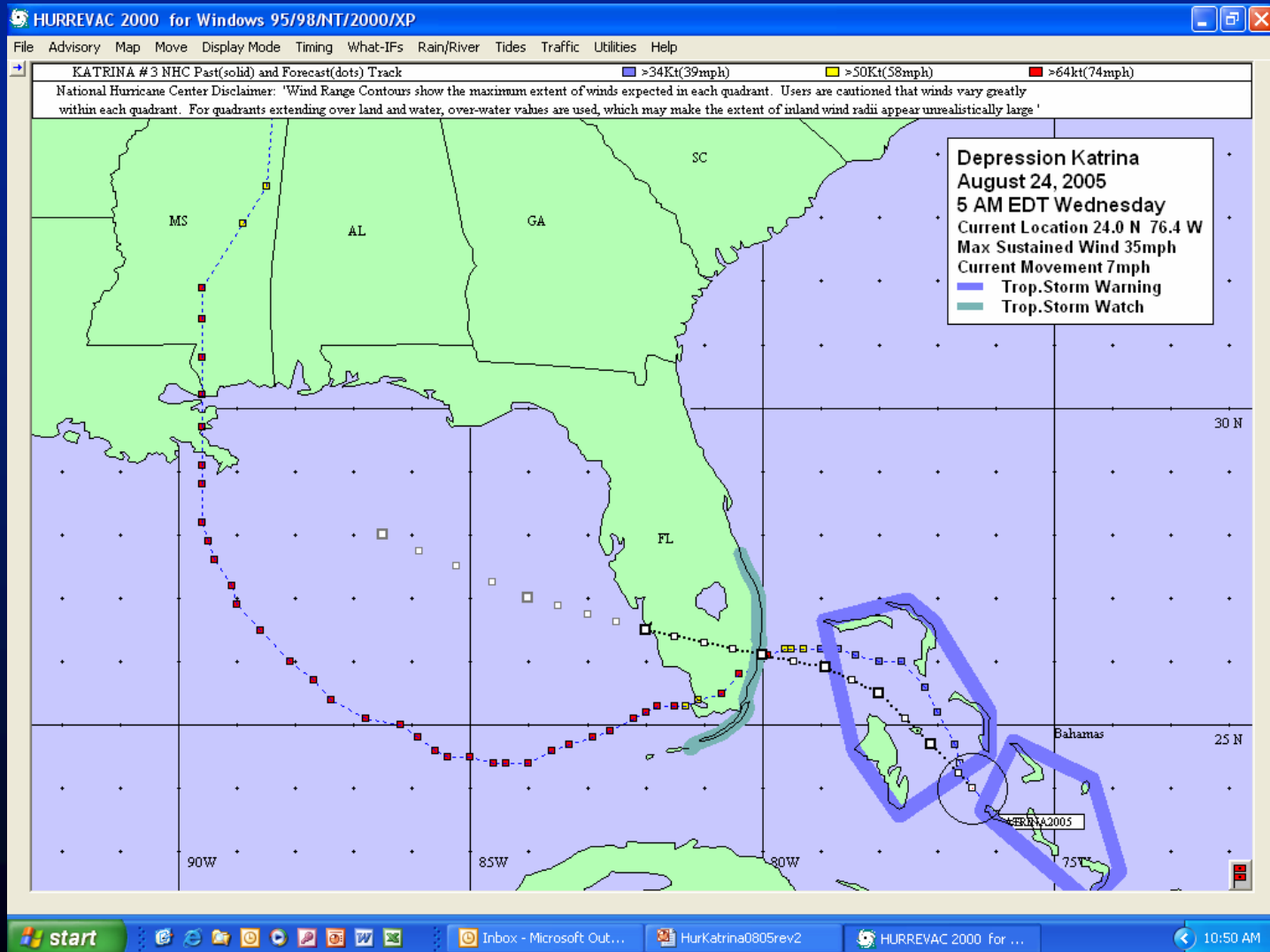
Hurricane Katrina History



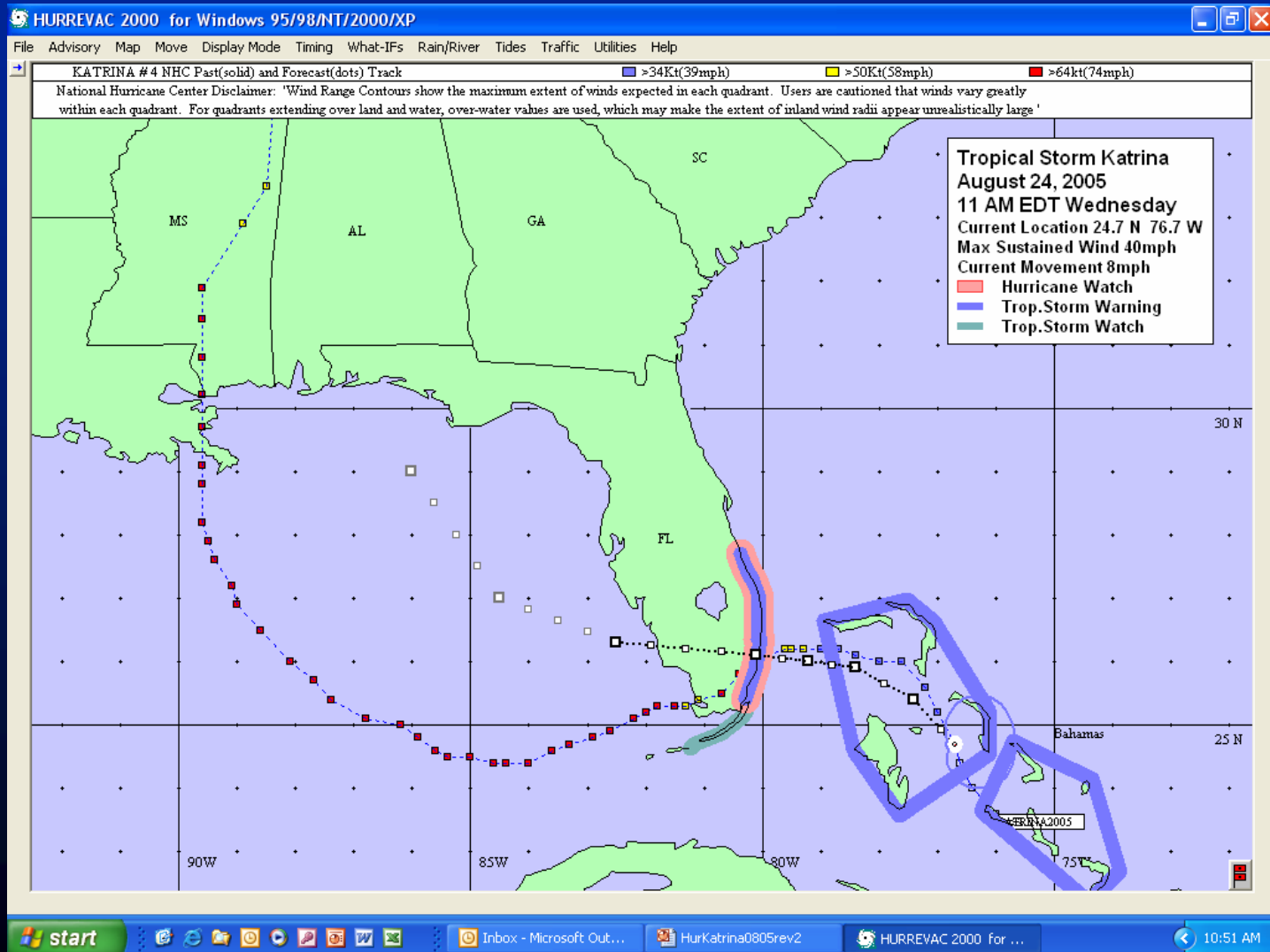
- August 29, 6 am - Katrina made landfall in Plaquemines parish, just south of Buras, as a Category IV storm with wind speeds of 140 mph.
- August 29, 9 am - MAF is in the West eyewall of Katrina
- August 29, 10 am - continuing north, Katrina made a second Louisiana landfall near the Louisiana/Mississippi border as a Category III storm with winds near 125 miles per hour.



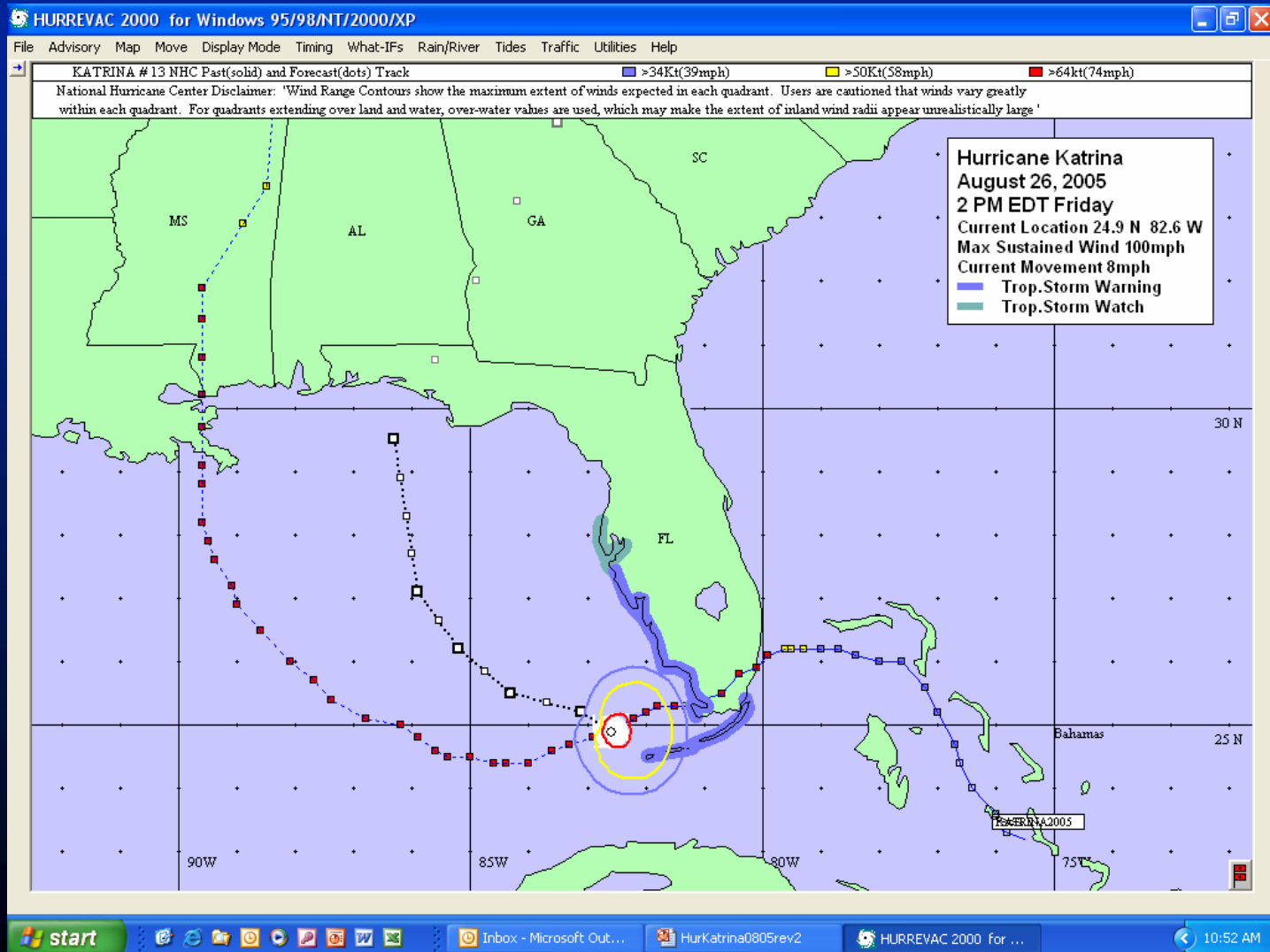
Hurricane Katrina History



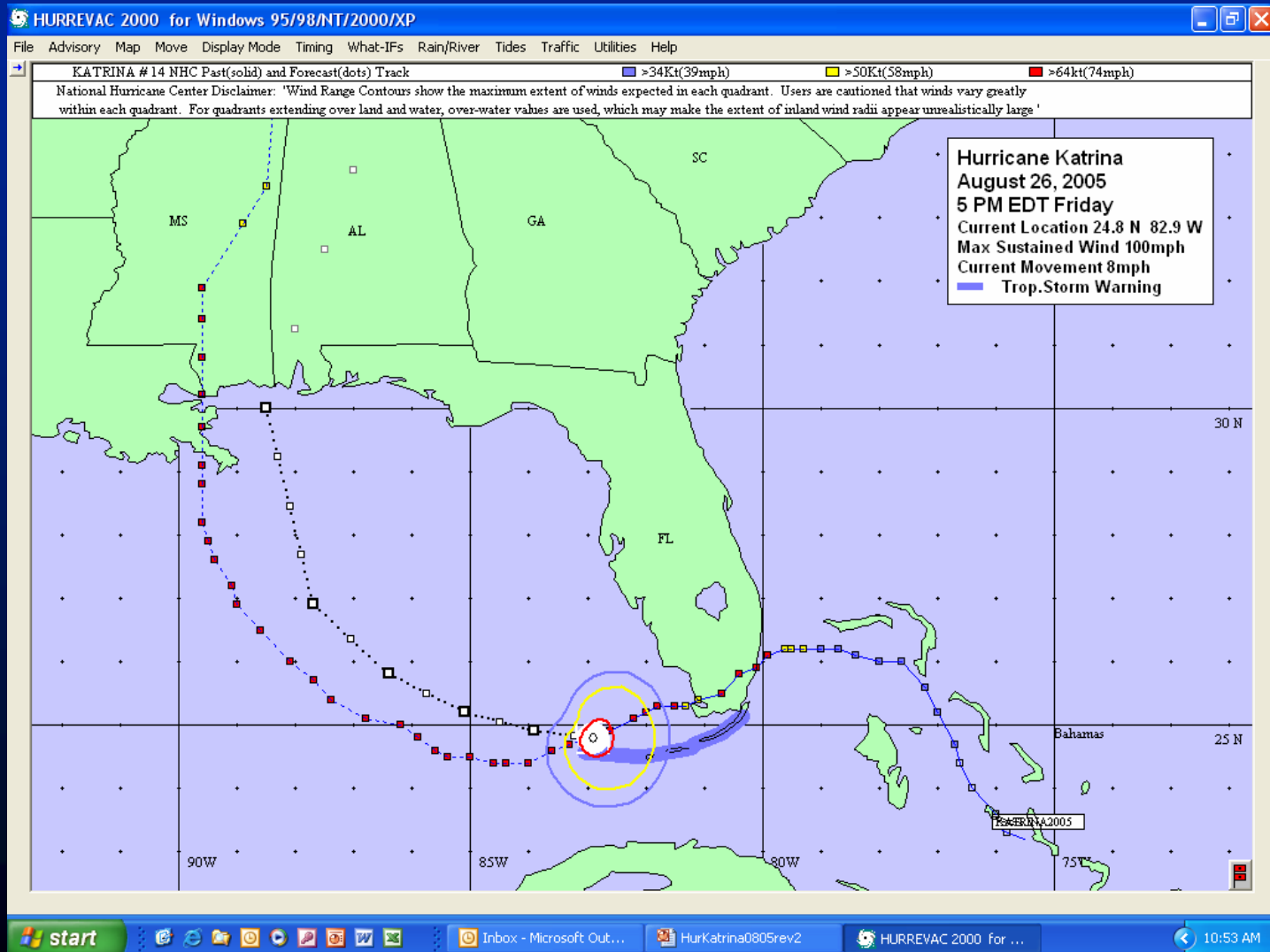
Hurricane Katrina History



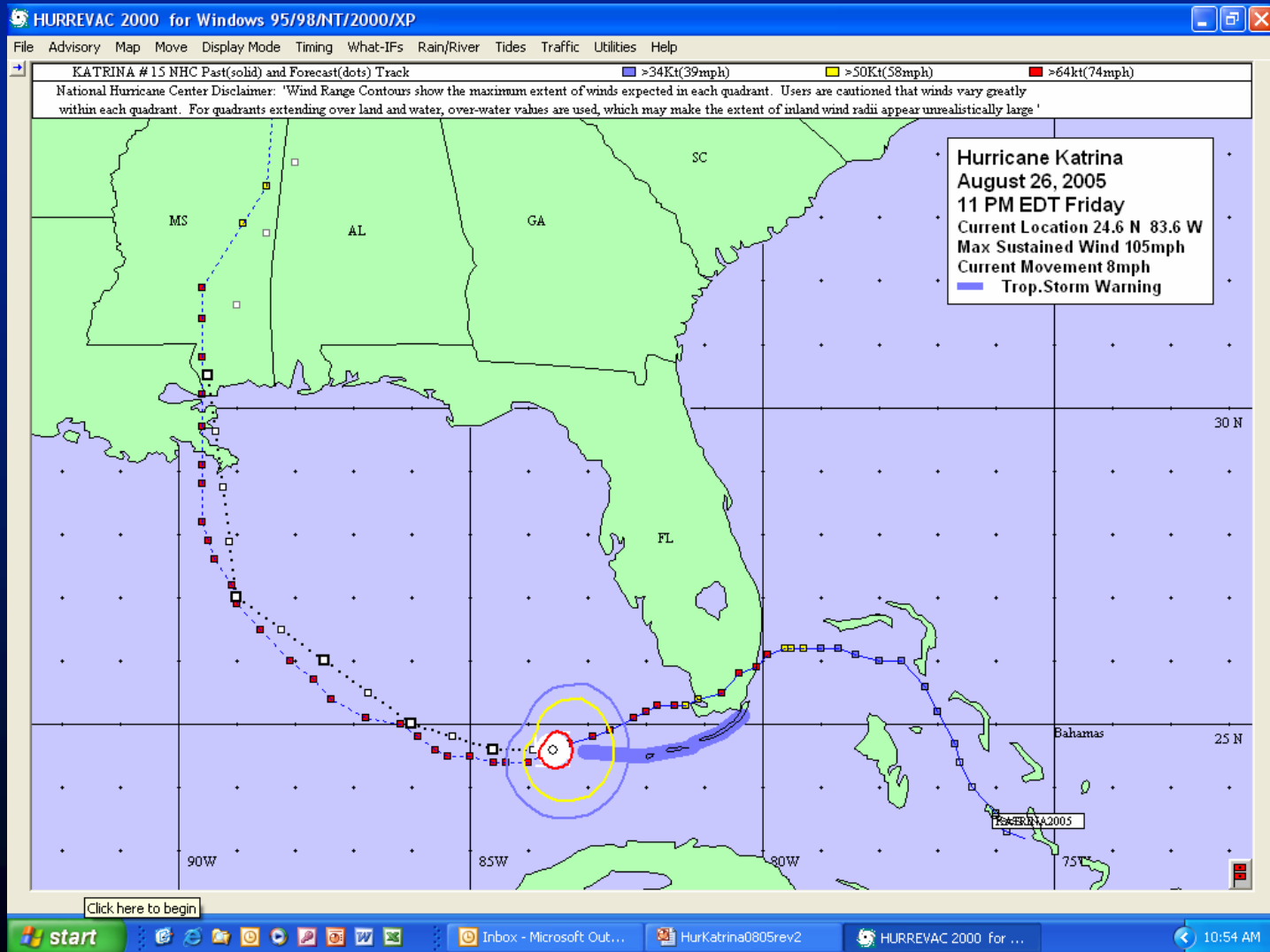
Hurricane Katrina History



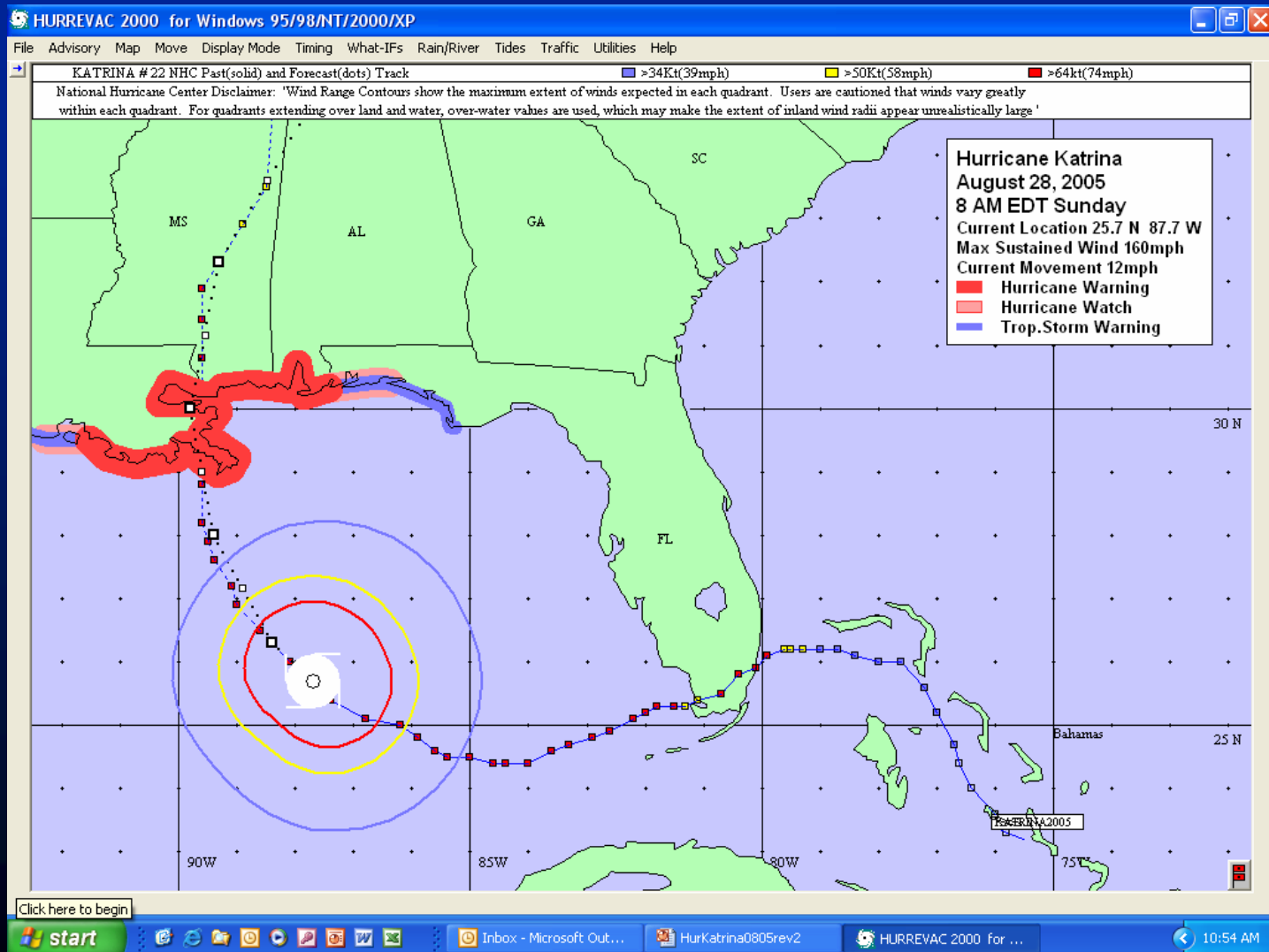
Hurricane Katrina History



Hurricane Katrina History



Hurricane Katrina History



Michoud Facility Damage



Aerial view east side of MAF





Things That Worked

- *Lockheed Martin Enterprise*
 - *Business Continuity Planning for 5 Years*
 - *Includes Crisis Management Planning*
 - *Corporate Wide Planning and Exercises in 2004/2005*
 - *Continuous Emergency Operations planning and preparedness*
 - *Collecting and Implementing Lessons Learned*
 - *Key Points of Contact within Business Areas and Corporate*

Things that Worked-Michoud



- *Closed facility well before arrival of storms.*
- *Communications via satellite phones and HF radio.*
- *Maintained data links for email and storm information*
- *Accounted for all employees.*
- *Status page to provide valuable real-time information to employees.*
- *Sheltered New Orleans Fire Department, 3 engine companies*
- *No storm related injuries at MAF*
- *Facility sustained moderate damage , no wide-spread flooding,*
- *8 External Tanks protected and sustained no damage.*
- *Maintained all pumps preventing catastrophic MAF flooding*
- *Maintained emergency power to key buildings throughout the storm*
- *Quickly established support contacts.*

Things that Worked-Michoud and Stennis

- *Developed alternate sources of water*
- *Coordinated land and air shipments of supplies*
- *Supported NASA damage assessment teams.*
- *Billeted three thousand military personnel*
- *Established and maintained working infrastructure to support military operations in Orleans and St. Bernard Parish while recovering and returning to production*
- *Production resumed 12 days after the storm.*
- *MAF opened to all employees November 1st.*

Lessons Learned



Lessons learned generated 58 actions in these categories

1. Communication – Voice

- *Need Multiple Communication Systems*
- *Increase number of satellite telephones*
- *Enable Text Messaging on cell phones*
- *Train Emergency Operations Center (EOC) members on equipment operation*

2. Communication – Computer/data

- *EOC members need multiple network connections*
- *Add internet accounts and email for EOC members*
- *Key servers at Michoud must be maintained*
- *Michoud status page must be interactive to allow employees to communicate*

3. EOC Layout and staffing

- *Enlarge EOC and ensure proper skills*
- *Need to harden and upgrade systems of EOC*

Lessons Learned



3. EOC Layout and staffing (con't)

- *Proper equipment at each workstation*
- *Need to designate locations for sleeping, breaks, work etc*
- *Evaluate skills needed for EOC*
- *Schedules need to be developed*

4. Logistics and Staging

- *Alternate work locations need to be developed*
- *Supplies availability*
- *Temporary living arrangements for EOC*
- *Pre-planning for essentials*

5. Michoud Operations Employees

- *Need to improve method to account for employees*
- *Pre-set evacuation locations*
- *Safety equipment when employees return to homes*

Lessons Learned



6. Facility

- *Improve provisions for fresh water*
- *Isolate electrical for key systems*
- *Servers and security systems on back-up power*
- *Repair and raise levee 2 feet*
- *Improve berms to prevent water from entering support buildings*

7. Preparations for Recovery/Ride-out Teams

- *Add functional checks to recovery team checklist*
- *Develop additional checklists*

